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December 5, 2009

Representative Brad Miller
Chairman
House Committee on Science and Technology
Subcommittee on Investigations and Oversight
1127 Longworth House Office Building,
Washington, DC 20515

And

Representative Paul Broun
Ranking Member
House Committee on Science and Technology
Subcommittee on Investigations and Oversight
325 Cannon House Office Building,
Washington, DC 20515

The Risk Management Association and Securitization Risk Roundtable: comments on risk models.

Dear Chairman Miller and Ranking Member Broun,

On September 10, 2009 the House Committee on Science and Technology's Subcommittee on Investigations and Oversight conducted a hearing on risk modeling and its role in the global financial crisis. The Risk Management Association (RMA) and the Securitization Risk Roundtable take this opportunity to comment on risk modeling. RMA, a member-driven professional association, helps financial institutions identify and manage the effects of credit risk, operational risk, and market risk on their businesses and customers. The Securitization Risk Roundtable consists of a group of risk professionals meeting on a regular basis to discuss key aspects of risk modeling and securitization.

The testimony of several witnesses at your hearing pointed to risk models, particularly Value-at-Risk (VaR), as playing a key role in the economic meltdown. However, the testimony may have raised more questions than it answered regarding the use of risk models. While the use of risk models may, as one witness at the Congressional hearing would have us believe, "have cast a hypnotic spell," we believe that risk models are not the reason for the financial crisis. Models are meant to be reflective of reality. Risk models are meant to prepare us for anticipated future states of reality. It is not a model problem that no major financial institution, regulator, or legislator was able to anticipate a future state in which house prices drop 20–70% and credit card default rates hit 13%, all within a very short period of 18–24 months. Therefore, no risk models were developed to simulate the world in that particular future state. In reality, government policies, the regulatory framework, financial market structure, and profit sharing/incentive structures are some of the leading causes for the current crisis.

Further, risk models are a few of the many tools that business managers, risk managers, and regulators use to assess overall risk while avoiding undesirable risk concentrations and

mitigating excessive risk taking. As with any financial instrument, risk models may be misused, mishandled, or abused. For example, risk cannot be fully represented if all of the risky positions are not included in the analysis.

We all need to remember that risk models are used not only for day-to-day risk management but also for regulatory purposes. We must be mindful that, in principle, it is the regulators who set the characteristics and parameters for the risk models used for regulatory purposes. Risk managers adapt different parameters and/or model characteristics to better address their institution's needs and its trading/investment strategy for their day-to-day risk management activities.

Consequently, regulatory models and risk management models may generate significantly different results and, therefore, have varying degrees of effectiveness in identifying significant risks.

Additionally, risk models have both strengths and weaknesses. It is important not to rely on a single risk measure and to have experienced risk managers assess the reasonableness of the results before they are submitted to senior management. For example, one characteristic of VaR is that it cannot measure crisis risk. In general, however, we believe the regulatory risk models have worked reasonably well for all risk classes, with the exception of structured products (in particular, complex credit structures such as re-securitizations). The risks in some credit structures were never modeled from the ground up looking through to the underlying assets, and the level of aggregation in the models combined with the assumptions on correlation led to a failure of the people who manage these models to accurately assess the risk in these product classes. Some financial institutions did observe heightened levels of VaR exceptions in interest rate, FX, equity, and commodity risk classes, but largely the market risk models worked well.

Risk models are not static. They constantly evolve in response to changing market environments, significant market disruptions, and/or model failures. That being said, we believe risk modeling can benefit from extensive market data availability. Investment banks were collecting and storing this data as part of their trading and sales activities. Now that some key banks have closed or merged into other entities, while others have been forced to significantly cut costs, it is important that regulators, research foundations, and universities step in to fill the gap until new players enter the field.

We offer comments on the following six issues:

1. What were the strengths and weaknesses of the models in handling the tasks for which they were designed?

It is important to distinguish among various classes of models on this point. Most of the Congressional testimony centered on VaR, because that has garnered the most attention to date. VaR is a very specific type of market risk model, designed to estimate risk in relatively liquid and generally normal markets. Financial institutions also rely on other models to calculate regulatory capital, estimate current valuations, and measure other types of market, credit, and operational risks. Additionally, this crisis started purely as a credit-generated event, not a market risk, so a focus on VaR will inappropriately limit the scope of the Committee's deliberations. In fact, the Committee would be hard-pressed to find any major firm or risk manager who believes that the firm's losses stemmed from a failure of VaR models.

Regulatory Capital Model (VaR, Credit Risk, and Specific Risk Models)

VaR has several strengths and weaknesses, which have been widely discussed.

Strengths of the model include:

- VaR for market risk is measured as the portfolio loss in unlikely adverse circumstances (e.g., one out of 20 chances) over a relatively short period (e.g., one day to one week). Because most market instruments are traded frequently, pricing models for liquid products are well developed.
- Risk models provide consistent and unbiased frameworks to measure and assess a variety of risks. They enable risk aggregation of individual strategies/products across portfolios and/or enterprises. This helps effective risk pricing and optimal capital management.
- Models are essential to reducing complexity and understanding broad levels and direction of risk. By facilitating a parsimonious and streamlined representation of all risks, they help isolate risk concentrations and identify natural hedges.
- For credit risk models, they are useful, at the single obligor level, in pricing debt and other corporate securities, estimating default probabilities, and determining optimal capital structure decisions.
- Credit risk models are also useful, at the portfolio level, in solvency analysis, identifying credit risk concentrations and portfolio optimization, and stress testing.

However, in the context of the events of the past year, the following characteristics of VaR do need to be acknowledged and well understood:

- Reliance on risk models without understanding the model assumptions could provide a false sense of security. For example, VaR is not designed to capture tail events. As such, knowledgeable players understand that VaR just will not forecast the future if the future is a crisis.
- VaR does not capture some key risk factors, in particular, dramatic reversals in historically proven relationships. Increased correlations among credits and a reversal of historical bond-CDS basis relationships led to significant losses last year.
- Risk models cannot capture unusual government intervention or significant regulatory changes in response to significant market dislocation as was the case in 2008. These actions had a significant effect on credit risk parameters like debt seniority, probabilities of default, and recovery rates. Risk managers cannot be expected to predict such events and include their effects in their risk measures.
- VaR does not capture systemic risk. The one-sided risk concentrations in the credit markets were not reflected in any meaningful way in any of the regulatory capital models, and VaR models had no way to allocate capital or identify emerging risk to market dislocations resulting from an inability to unwind these credit concentrations.
- Some VaR models do not capture liquidity risk in any meaningful way, particularly if they follow the holding period assumptions that are embedded in the regulatory guidelines. Some firms use internal VaR models which explicitly adjust for liquidity risk in order to overcome this problem of the regulatory VaR model.
- Overreliance on a single risk measurement such as VaR could be misleading. VaR works well under normal market conditions. Stress testing is more appropriate to measure risk exposures under extreme events or market dislocations.
- The risk of complex transactions/illiquid products cannot always be adequately captured by aggregate portfolio level risk measures. Substantial non-linearity of results and the effects of a disappearance of market liquidity are not well modeled in a *one simplified number* approach.

Valuation Models

The main issue for valuation models is that they presuppose the existence of observable market inputs; financial institutions encountered significant challenges in a number of areas in this regard. Experience over the past year has highlighted the importance of

having a rigorous independent price verification process, particularly with regard to Level III assets where price discovery has been a challenge. A high caliber of market and analytic capability is required, particularly when proxies or alternative models are used. These capabilities then need to be augmented by a strong level of senior oversight, a solid model validation framework and an engaged accounting policy team. Finally, it is important to note that valuation models are point-in-time, and are not predictive.

Other Risk Measures

Other risk models are perhaps the most important tools in the arsenal of risk functions, and may be underappreciated by regulators. There are a variety of complementary risk measurements and models to address different risk issues. For example, experienced risk managers all know how useful stress testing is as a complement to VaR.

The importance of well-designed, comprehensive, and granular risk measures cannot be overstated. A comprehensive stress testing capability is a key component, and it is important to understand the most extreme outcomes and to have some strategy for mitigating risk if market trends deteriorate to conditions that may have formed part of a stress scenario—as they clearly did post-Lehman. The effectiveness of a stress testing program depends on having an inquiring and curious culture, with a desire to explore extreme outcomes even if they are discounted as having low probability. An inquiring culture can have the most impact in the approval process for new products and initiatives where the understanding of worst-case outcomes helps firms avoid the big mistakes.

That being said, risk models, in general, have the following weaknesses in handling the tasks they are designed to address:

- Models are based on idealized behavioral assumptions that are not always met in the real world. Observed behaviors may deviate from those which appear to be economically rational. The new field of behavioral finance is expanding precisely as a consequence of these effects.
- Often, large consequences may arise from what appear to be small details. Risk takers, risk managers, and regulators sometimes do not fully appreciate the effects of those details.
- Model outputs are only as good as the input assumptions. For example, loss estimates predicated on the existence of sufficient collateral assumed that the collateral could be seized and liquidated (or refinanced) to redeem the associated debt. No model estimated higher losses based on an assumption of governmental action which would favor junior debt held by unions over senior secured debt held by investors.

2. Were the models used in ways for which they were not designed? If so, what were the consequences?

- There may have been undue reliance placed on regulatory capital models at senior levels in some firms. There is a healthy degree of skepticism that any single class of models can provide a fulsome view of enterprise risk among risk practitioners. However, the regulatory community has historically had an exaggerated view of the value of regulatory capital models, although this is gradually changing with the emphasis on Pillar II disciplines such as economic capital, stress tests, and risk governance around emerging risks.
- Risk results are not entirely comparable across different organizations. For example, different assumptions and look-back periods could be used for the same risk measurement between different organizations. Comparing VaR results of two different financial institutions could be misleading without consistent and transparent disclosures of risk measurement techniques and methodology.

- Risk measurements/models are not always applicable to certain products and/or under certain circumstances. Model users need to understand the appropriate uses for specific models and their applicability across classes of complex financial products. Additionally, in an ever-changing financial landscape, new products without adequate performance history are difficult to model.
- In the market risk world, VaR works best to estimate the risk of frequently traded market instruments. During crisis periods, markets for certain instruments might cease to function, resulting in infrequent trades and degraded market data. This type of crisis may undermine the validity of VaR-based risk measures.
- Most trading models are designed for making two-way markets and estimating risk on open positions that are taken for a relatively short period of time. Some firms confused simplified risk neutral trading assumptions with complex real world distributions.

3. Were there significant limitations or flaws in model design when seen from the point of view of effective risk management?

All models are in a continuing state of evolution due to changing economic conditions, regulation, and data. There certainly have been instances of models that gained widespread industry acceptance due to attributes such as mathematical tractability or simply because they represented a common market standard even though their validity was based on theoretical assumptions with significant simplifications or abstractions from market realities. Examples include the Copula model as well as the original Black-Scholes model. Other characteristics include simplified views of correlation, more reliance on recent trends, and inconsistency between instrument liquidity and employed leverage. Most good traders and risk managers appreciate model limitations and try to compensate for the flaws in various ways. From an enterprise perspective, model risk should be considered and appropriate governance around model review and vetting is critical. Key model dependencies should be identified, and where material risks or valuations are model dependent, there should be some redundancy in the design of controls. Effective risk management must incorporate regular back-testing of model results versus actual results to detect possible flaws/limitations in the use of risk models.

A list of some recognized model limitations and/or flaws and suggestions on possible improvements:

- Risk models are sometimes based on simplified assumptions to integrate risks across the portfolio and reduce processing time. Active communication is necessary between risk managers, risk modelers, and line managers to understand and assess the applicability of the methodology and assumptions along with their impact on reported model results.
- Stress test results are significantly improved if system-wide interactions and feedback effects are taken into account. At present, individual financial institutions are not able to access proprietary position information of other financial institutions, and thus would not be able to properly evaluate systemic risk concentrations. However, a regulatory oversight body with access to such information across firms should be in a position to identify systemic risks.
- For credit risk models, the forecasted distribution is subject to a variety of credit related assumptions and parameters that are difficult to expressly observe and model. Therefore, simplified or more generic structures are often used.
- The ability to effectively test the validity of credit risk model components is limited. Historical data available on the performance of different types of credits generally do not span sufficiently long time periods.
- Model driven scenario analysis may not be intuitive or easily comparable to real-life scenarios by senior management. For example, Monte Carlo simulation-based VaR is helpful in incorporating both subjective judgments and other

information to adjust forecasted probability distributions but it is not as intuitive or understandable as historical simulation based VaR.

- Liquidity risk which depends on market conditions is very difficult to model. Therefore, some models do not adequately incorporate liquidity risks and thus may not be effective during a crisis.

4. Was the degree of faith placed in the models by various groups within financial institutions appropriate?

- All models are not equal. The wide dispersion of results during the recent market turmoil indicates that the problem may not be models per se, but rather the quality of models and the nature of their utilization.
- Mechanical risk measurement is not a substitute for a serious qualitative assessment of underlying risks and their resulting impact. As such, models are not a substitute for senior management support and involvement in the risk management process.
- Risk reporting requirements should be top down from board members or management committees to reinforce their understanding of risk. There should be adequate disclosure on how the reported risk measures should be interpreted.
- There should be appropriate levels of quality control on the data, risk measures, and resulting reports produced for decision making.
- At some firms, transactors, senior managers, and risk managers placed too much faith in quantitative models relative to qualitative judgment. The models extrapolated recent trends in declining volatility to generate overly optimistic loss forecasts.
- Many investors relied heavily, or completely, on model driven rating agency assessments. These subsequently turned out to be overly generous.
- For those infrequently traded instruments, risk management should include limiting the exposure size rather than solely on sophisticated models.

5. How do incentive structures influence the use of models and/or the risk manager's ability to do his/her job?

- Incentive structures are the red herring of this entire crisis. The firms with very restrictive bonus structures—AIG, Lehman, and Bear, where employees held huge amounts of stock either through mandatory deferred compensation or management pressure—were among the worst hit. For the most part firms got in trouble for two reasons 1) inadequate credit management and 2) overly generous estimates about market liquidity.
- The Financial Stability Forum (FSF) recently published Principles for Sound Compensation Practices, suggesting a larger role of risk assessment in setting compensation levels.
- Incentives for risk takers focused on illiquid assets require particular care to eliminate mismatches or inconsistencies.
- Incentive structures can influence the use of risk models. For example, risk takers typically prefer risk models to be shorter-term focused in order to generate current compensation. On the other hand, risk managers and senior management tend to focus on longer-term results and, therefore, prefer risk models to incorporate longer-term variables.
- Another area of conflict is the length of look-back periods for the calculation of VaR. Risk managers tend to use longer-term look-back periods to adequately capture the market-value risk while risk takers usually advocate the use of shorter look-back periods to align the estimates of VaR with a short-term investing and hedging strategies.
- In order to appropriately allocate corporate resources, financial firms should attribute economic capital (EC) usage to the lines of business. Similarly they should charge funding costs appropriately to users, including any options and

liquidity costs. This type of costing should then be incorporated into compensation formulas.

- Model uncertainty should be reflected within internal management reserves to limit the early recognition of profits which may not subsequently be realized. Incentives should be weighted towards realized or locked-in profits, and compensation should be aligned where possible to revenue recognition.

6. How does the information derived from models complement, or conflict with, judgment based on individuals' experiences?

- Quantitative output from the risk models should be complemented by qualitative judgments from experienced risk managers. For example, model driven analyses, such as VaR, are typically only one component of risk assessment and control, usually complemented by non-quantitative market driven input from senior management and trading desks.
- Firms that outperformed through last year's events were those that made critical risk reduction decisions based on management assessments which were informed by a variety of inputs, some model-based, some market-based. It is important to develop a holistic picture that synthesizes a market view based on all available information and to have a risk management culture. This holistic view, when properly informed by market intelligence and insightful, forward looking analysis, can compensate for deficiencies in a pure model-based approach, and in particular, can take factors like liquidity and systemic risk into account.
- Integration of market player behavior in model outcomes is lacking. Incorporating behavioral research findings into model results should allow models to provide more realistic results.
- The experience and the quality of risk managers' judgments determine the ultimate results and effectiveness of a firm's risk management process. Risk managers need to use their judgments and experiences to translate risk measures and influence appropriate actions/decisions.
- Models provide valuable input into business decisions. However, all models have assumptions that can be violated by either specific transaction structures or by certain market conditions. If individuals do not understand the assumptions behind the models, then they will never know when the models may not be appropriate.
- Models alone typically are not the cause of firm failure. For example, during the crisis, mortgage underwriters were devastated. These bankruptcies were not caused by model failure, but rather by a lack of good underwriting. The decline in underwriting standards over the decade was based on an assumption that they could sell anything that they could originate.

In addition, the RMA Securitization Risk Roundtable recently released an initial document outlining industry views on the key risk issues facing securitizations and the recommended next steps. The Securitization Risk Roundtable consists of a group of risk professionals meeting on a regular basis to discuss key aspects of risk modeling and securitization. Areas addressed in the document include risk retention, models, and transparency. Each of these areas is a necessary ingredient to regain marketplace acceptance and confidence that the recent crisis will not be repeated. We attempt to accomplish this in a way that is understandable to non-quantitative market, regulatory, and lawmaking individuals, who now play a key role in the support and sustainability of these markets. Below is a brief discussion of several issues highlighted in the report:

- Risk retention should be a required feature for future securitizations, mandated by either legislation or regulation. Also, risk retention should be proportional to the riskiness of a deal; that is, the riskier a deal, the greater risk the issuer should keep on its balance sheet. Ongoing monitoring and measuring of the levels of risk retention and pooling of risks must be standardized and done independently.

- Benefits of such risk retention include improved representations and warranties and improved secondary market valuations and liquidity.
- Risk retention requires adequate risk transparency. A prerequisite for greater risk retention is the issuer's ability to manage risk internally and make risk transparent. The best way to provide risk transparency is a look-through approach, starting from the risk characteristics of the underlying pool of borrowers and collateral. Also, risk assessment and risk management of a portfolio of securitizations should not be completely dependent on *rating* alone.
 - Regulators must differentiate between fraud loss and realized credit losses based on honest, competent underwriting. Risk retention will discourage weak underwriting but will not eliminate frauds. On the other hand, normal losses will arise from systematic events such as market cycles, as well as idiosyncratic factors such as borrower hardships.
 - Most investors desire *tail protection*. Therefore, from a risk perspective, the focus should be on unexpected loss rather than on expected loss. This is the big paradigm shift in the securitization world. Given adequate transparency and market standard models, investors can compute both expected loss and shortfalls. If risk capital is a function of tail loss, then a capital constrained issuer will try to minimize tail risk, thus aligning his/her interests with those of the investor. We believe this implies that regulatory and legislative rules should focus on the requirement to hold capital against unexpected loss.
 - The relative cost of capital in the current environment is very high and may make transactions uneconomical for issuers, thereby reducing credit availability for consumer and commercial borrowers. New capital requirements should only be imposed within a time frame that allows the system of consumer finance to adjust and avoids further market disruption.

In summary, we applaud the committee's recognition and treatment of this important issue and welcome responses to this comment letter. If there are any questions regarding this letter, please contact Francis Garritt, Manager, Market Risk at 215-446-4122 or fgarritt@rmahq.org. More importantly, please let us know if RMA can be of assistance with any future issues.

Sincerely,



Aleem Gillani
Chair, Market Risk Council, The Risk Management Association



Joseph Masri
On behalf of the Securitization Risk Roundtable

CC: Francis Garritt
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